



Briefing for the Joint Commission on Technologies and Science (JCOTS)

Transoceanic Subsea Cables and Broadband Expansion in Virginia

Dec 6, 2017



VIRGINIA BEACH,
VIRGINIA

MAREA

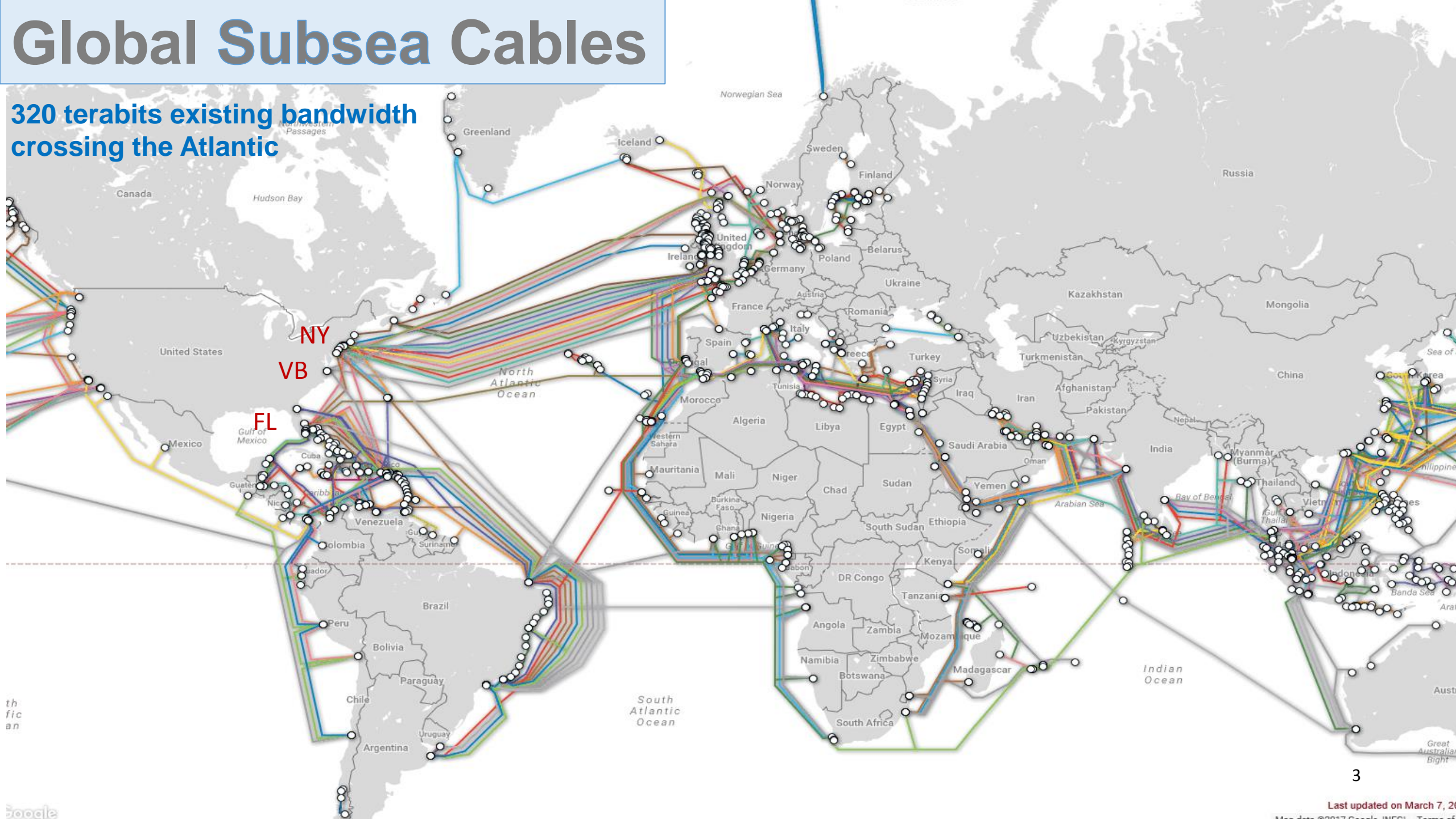
BILBAO,
SPAIN

BRUSA

FORTAZELA,
BRAZIL

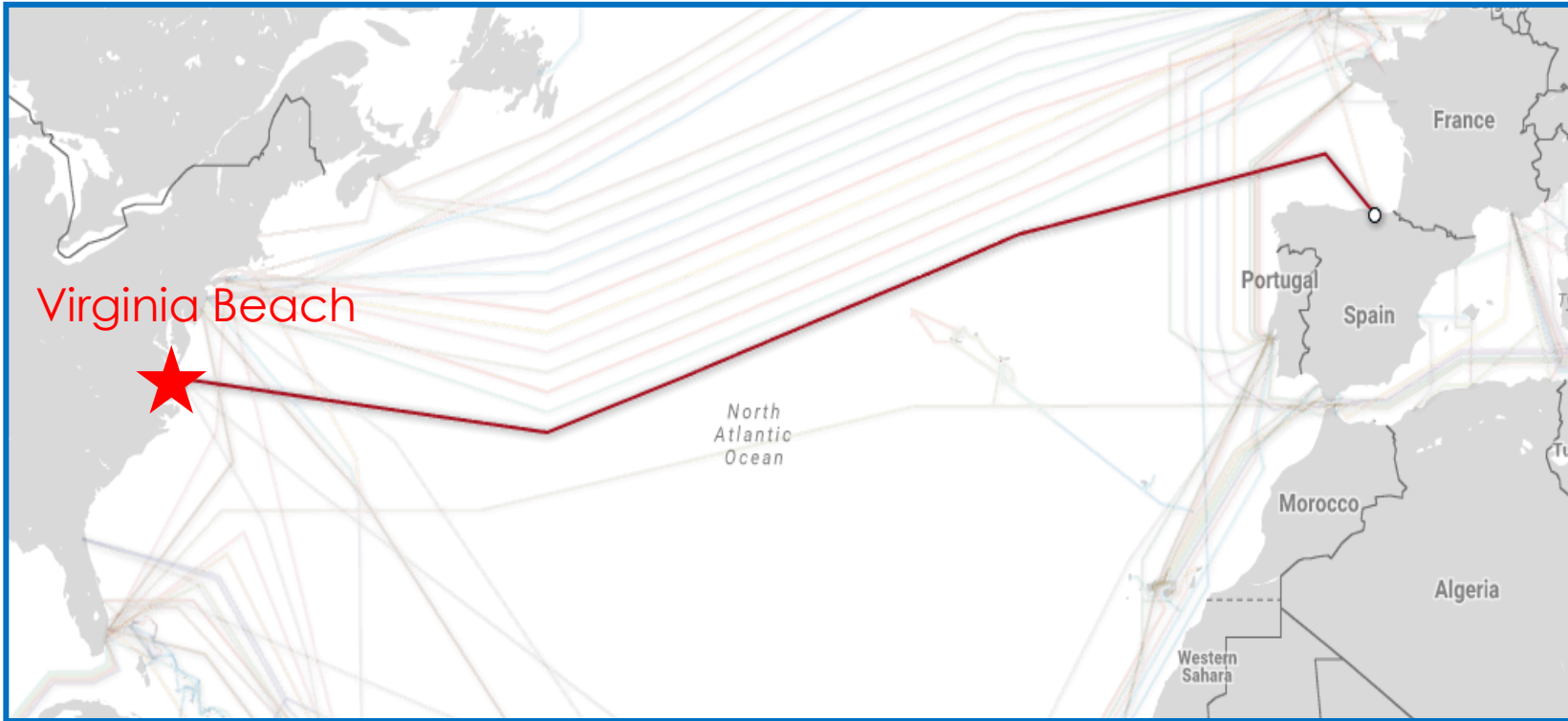
Global Subsea Cables

320 terabits existing bandwidth crossing the Atlantic



Transoceanic Subsea Fiber Cables

Virginia Beach to Bilbao, Spain



System Testing: **November 2017**
System Operational: **December 2017/January 2018**

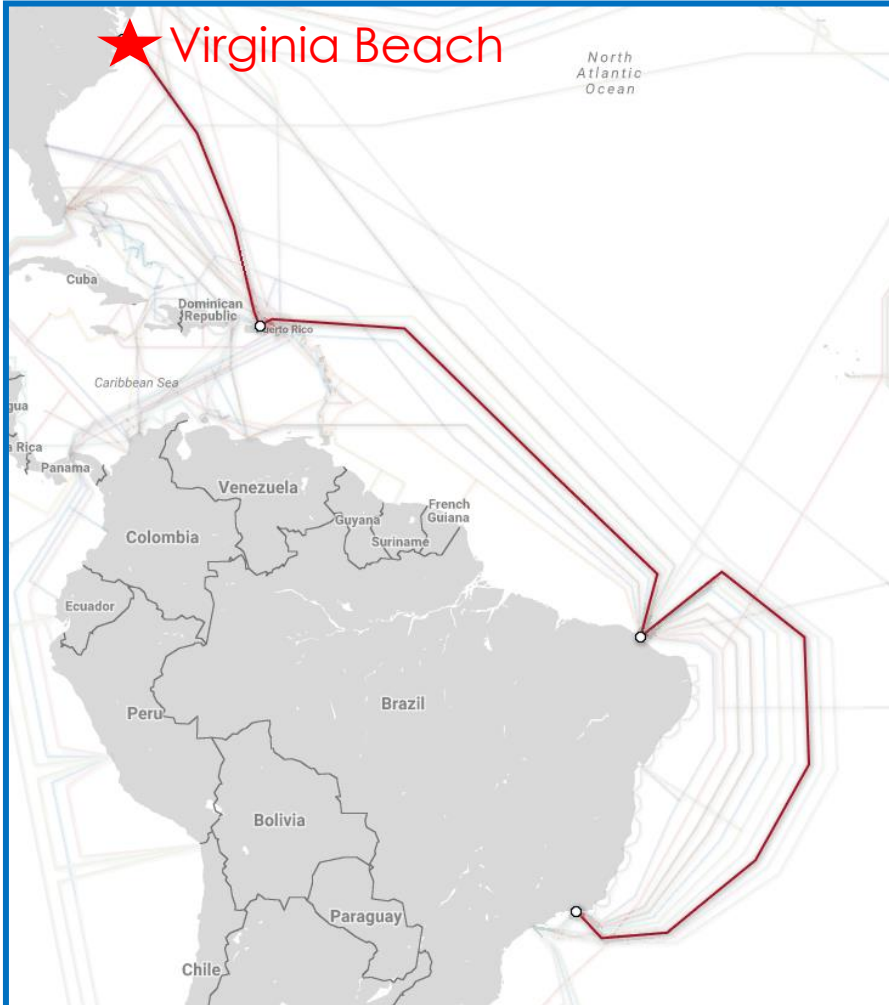
MAREA

- Led by **Microsoft and Facebook**, MAREA is the **highest-capacity subsea cable to ever cross the Atlantic**
- The new **6,600 km submarine cable system connects Virginia Beach, Virginia to Bilbao, Spain**
- This new southern route **provides greater diversity of connections & enhanced reliability** for customers
- Optimal connectivity to data centers on the East Coast
- Highest capacity cable to ever cross the Atlantic Ocean at 160 Tb/s

Transoceanic Subsea Fiber Cables

Virginia Beach to San Juan, Puerto Rico and Rio de Janeiro Brazil

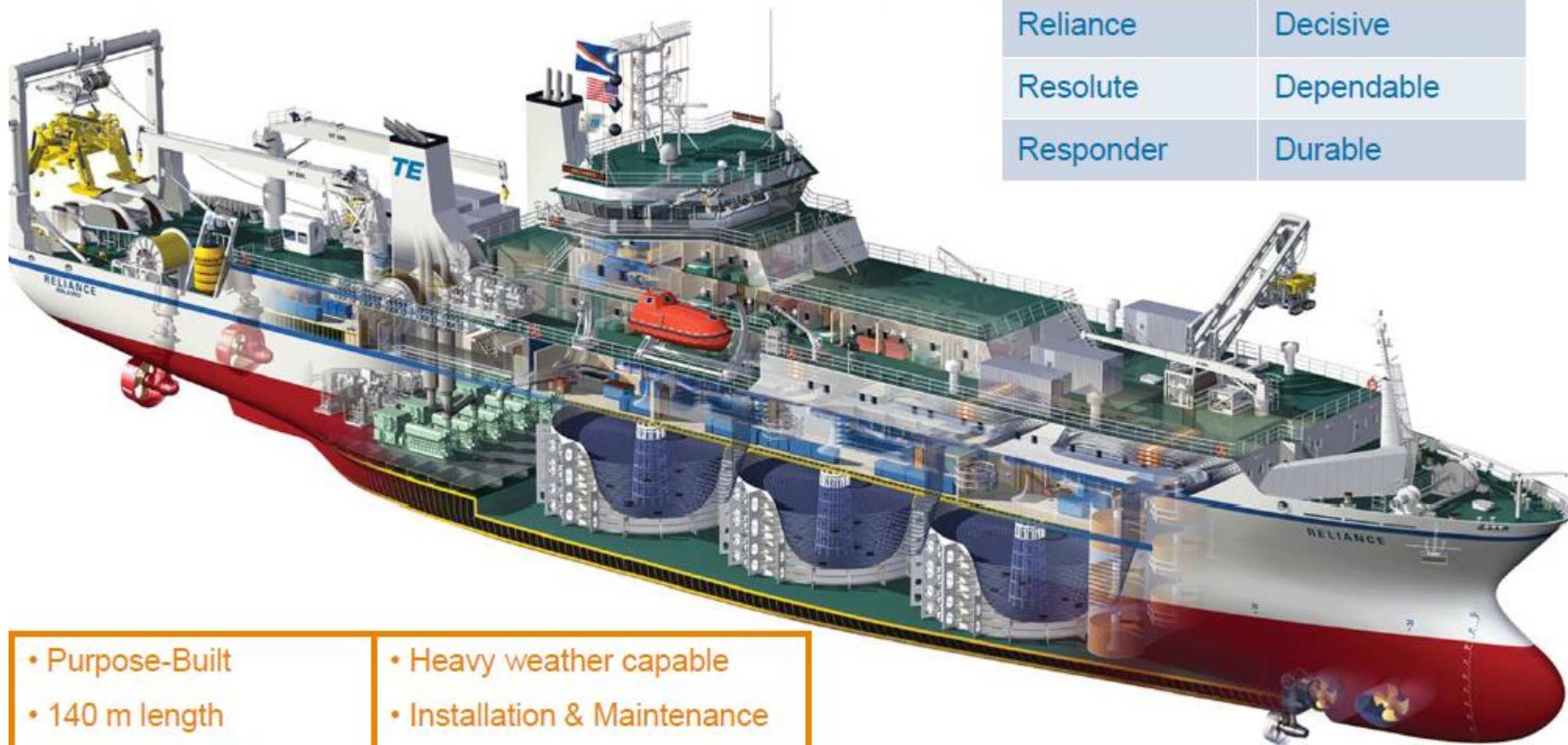
BRUSA



BRUSA Cable and Conduit Installation: **June 2018**
(dates per Telefonica)

- Nearly **11,000 km in length** linking **Rio de Janeiro** and **Fortaleza** (Brazil) with **San Juan** (Puerto Rico) and **Virginia Beach** (USA)
- Leading edge technology supporting **ultrafast transmission capacity**
- Increased end-to-end connectivity and the **availability of ultra high-speed broadband services**
- This new **infrastructure will address the exponential growth of data transmission** generated by its B2B customers, telecom operators, OTT players and end-consumers
- Will **improve communication reliability and deliver enhanced resilience by increasing the number of USA landing points**
- Will also provide the **lowest latency communication links between the two largest economies in the region, Brazil and USA**

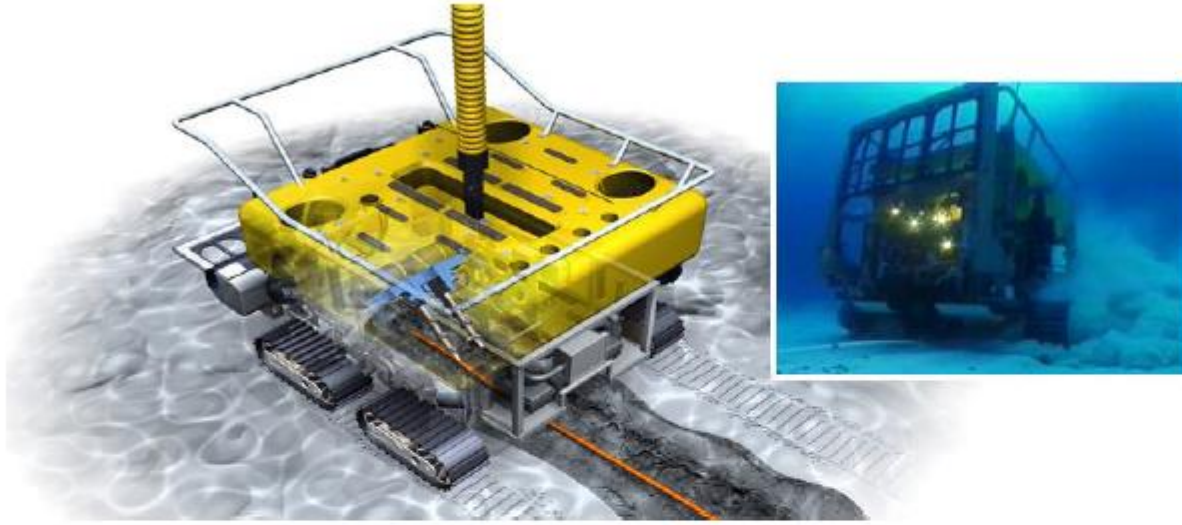
Reliance Class Cable Ships



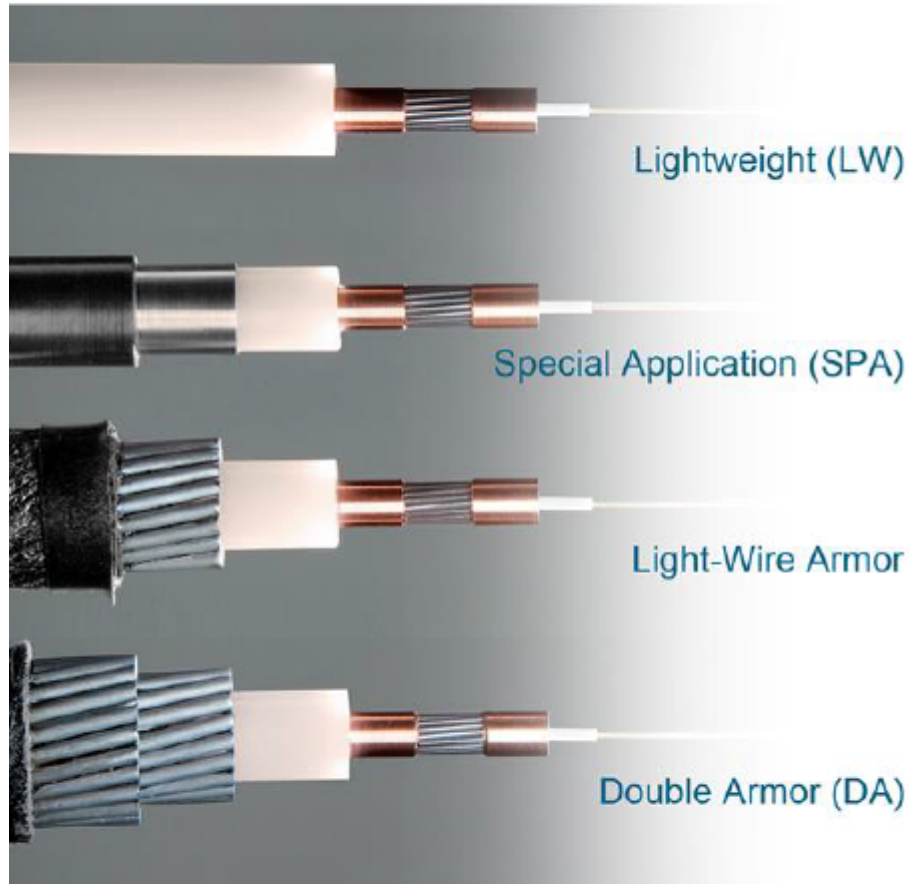
Reliance	Decisive
Resolute	Dependable
Responder	Durable

- Purpose-Built
- 140 m length
- 5,500 MT cable cap.
- 84 persons
- 60+ days endurance
- Heavy weather capable
- Installation & Maintenance
- Highly maneuverable (DP2)
- Plow & ROV equipped
- 60 MT A-Frame

Various Burial Tools & Methodology

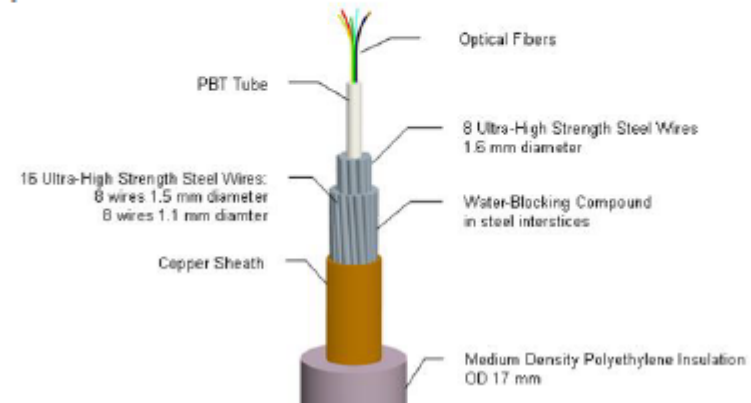


What are undersea fiber optic cables?



Undersea cables...

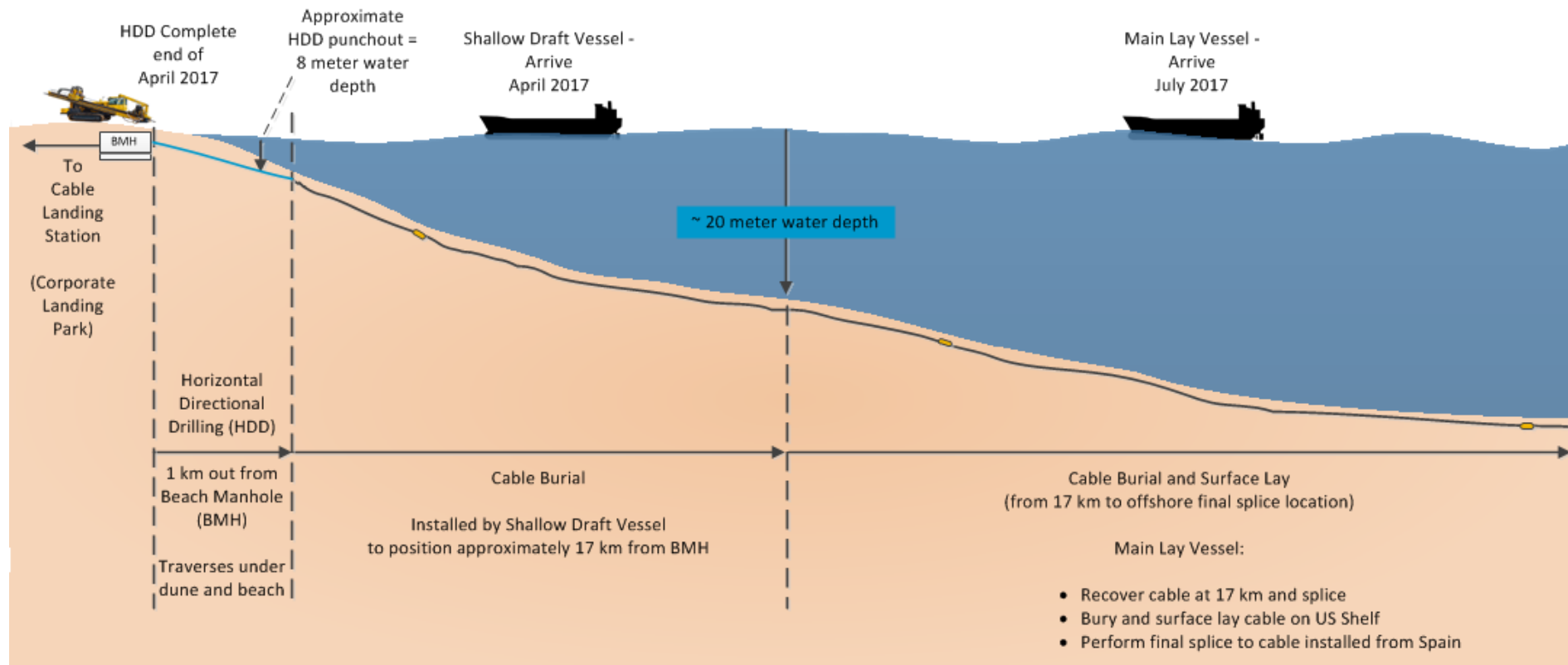
- protect optical fibers and an electrical conductor to carry telephone, internet & data communications traffic at ~2.5 TB/second;
- are built durable, yet flexible, to support system deployment, recovery, repair & re-deployment;
- are inert in the marine environment;
- offer various levels of protection from subsea conditions and external aggression, such as: rocky terrain, fishing activity, high risk of abrasion or crushing (e.g., anchoring), and the deep ocean.



Transoceanic Subsea Fiber Cables

MAREA Cable – From beach to manhole

- **Oceanic** Infrastructure connection of subsea cable
 - Will connect sub-sea cable to off-shore duct duckbill flap (4 conduits for the MAREA/BRUSA beach manhole)
 - Clear in (ships check in port)
 - (shallow draft vessel)



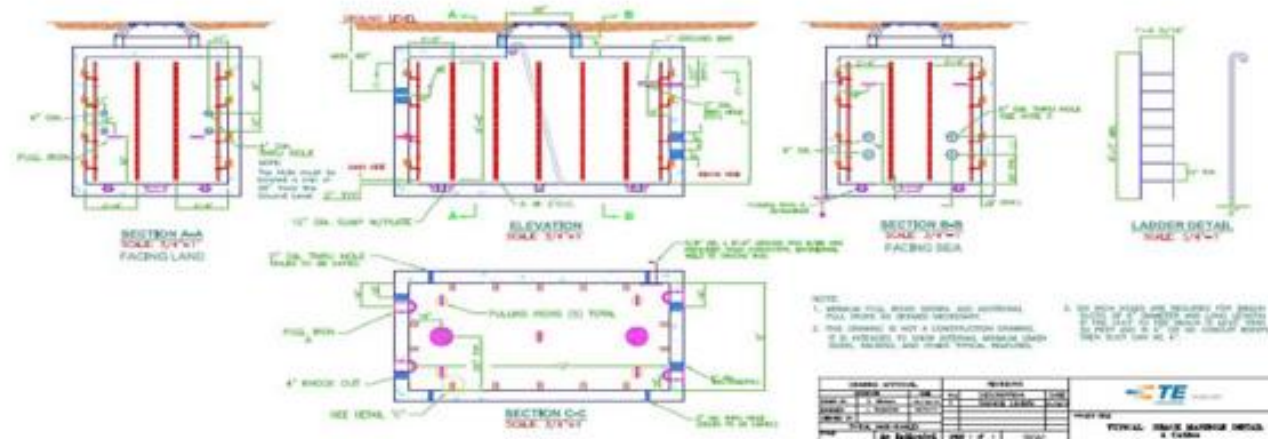
Transoceanic Subsea Fiber Cables – Shallow Water Vessel



Transoceanic Subsea Fiber Cables – Landing Point, Camp Pendleton



Transoceanic Subsea Fiber Cables – Man Holes



- 2 BMH's planned
- Typical BMH Design: 12' L x 6' W x 7' H
- Buried (below ground level) within the parking lot, with corresponding buried ocean ground bed anodes
- No Significant impact to the long-term functionality of the parking lot

CORPORATE LANDING CABLE LANDING STATION

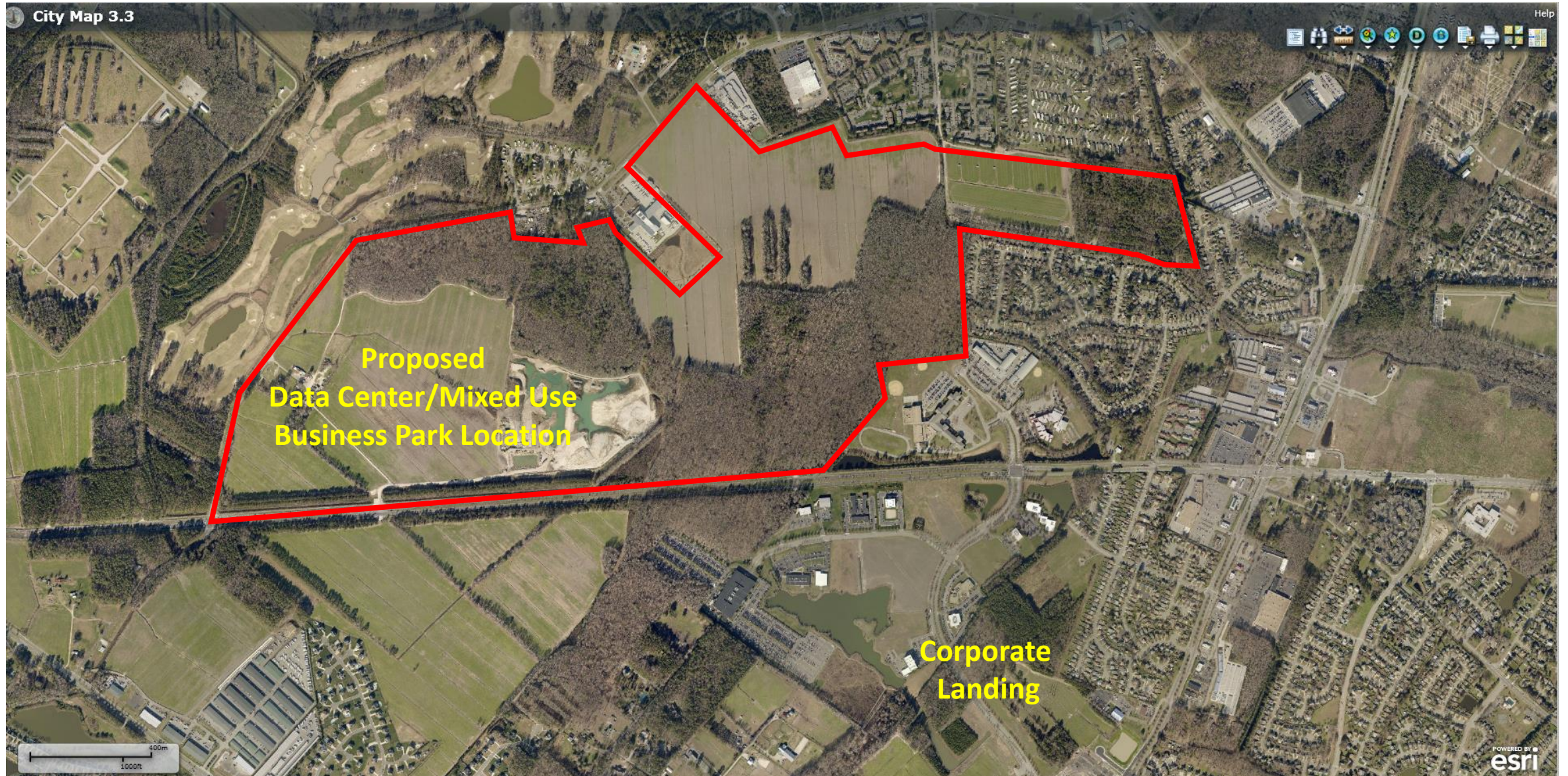


MAREA Cable Impact

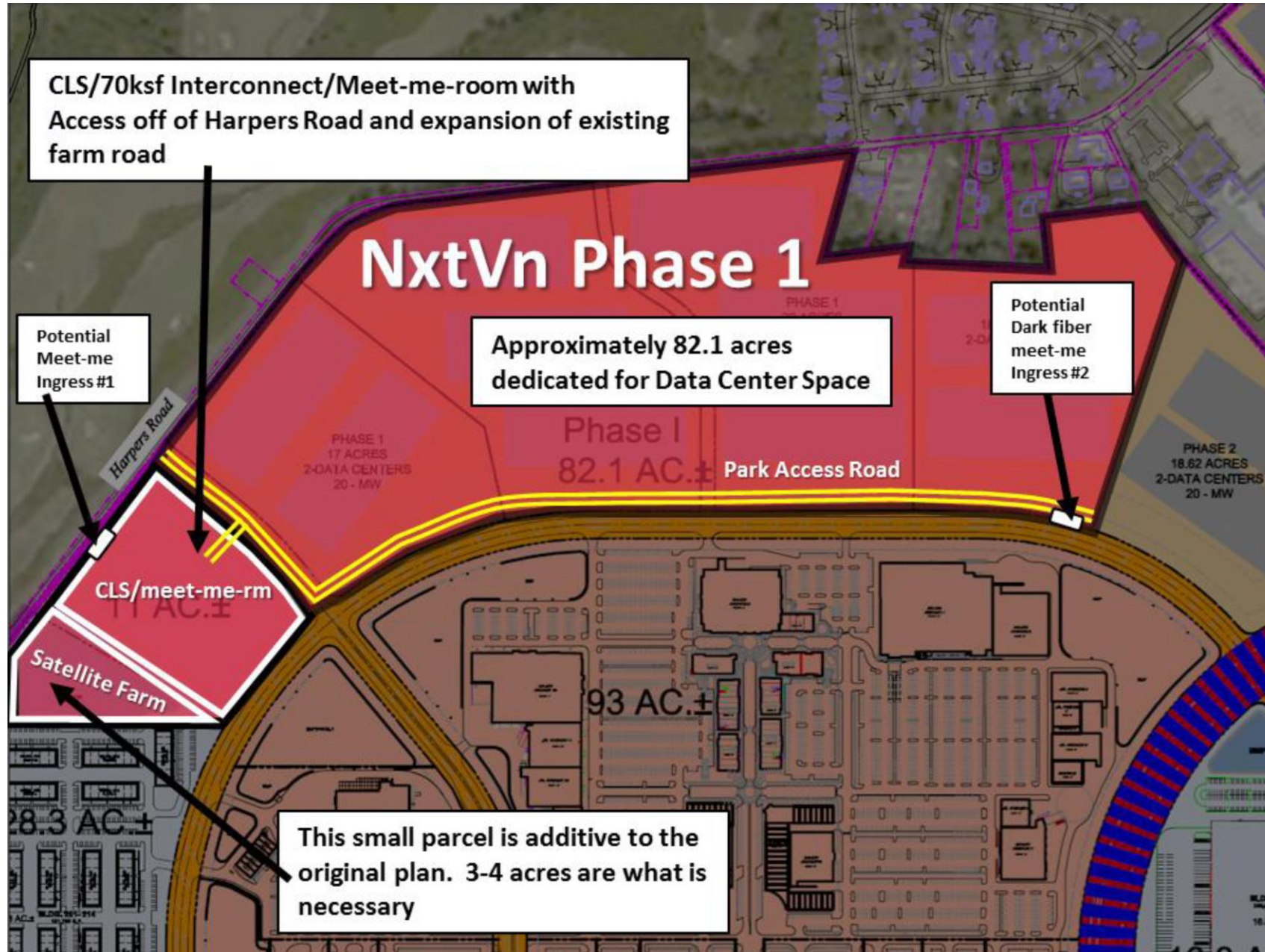
- Cable lands in Camp Pendleton, to be connected to new 24,000 sf cable landing station in Corporate Landing
- One-time economic and fiscal impact from construction of cable landing site
 - 61 annual full-time jobs
 - \$8.9 million economic output
 - \$0.3 million tax revenue
- Ongoing annual economic and fiscal impact
 - 10 annual FTE jobs
 - \$1.1 million economic output
 - \$0.23 million tax revenue



PROPOSED DATA CENTER PARK



PROPOSED DATA CENTER PARK



Data Center Impact

- **Workforce**
 - Virginia data center employment grew 6.7x faster than the norm last year
 - Annual salaries grew 9.3x faster (\$106,000 average)
 - Ex: Microsoft's Data Center Campus in Boydton, VA employs nearly 500 FTEs with \$89.3 million in economic output
- **Investment**
 - Microsoft has invested nearly \$1.7 billion in its Boydton campus
 - Generating \$12.1 million in local and state revenue



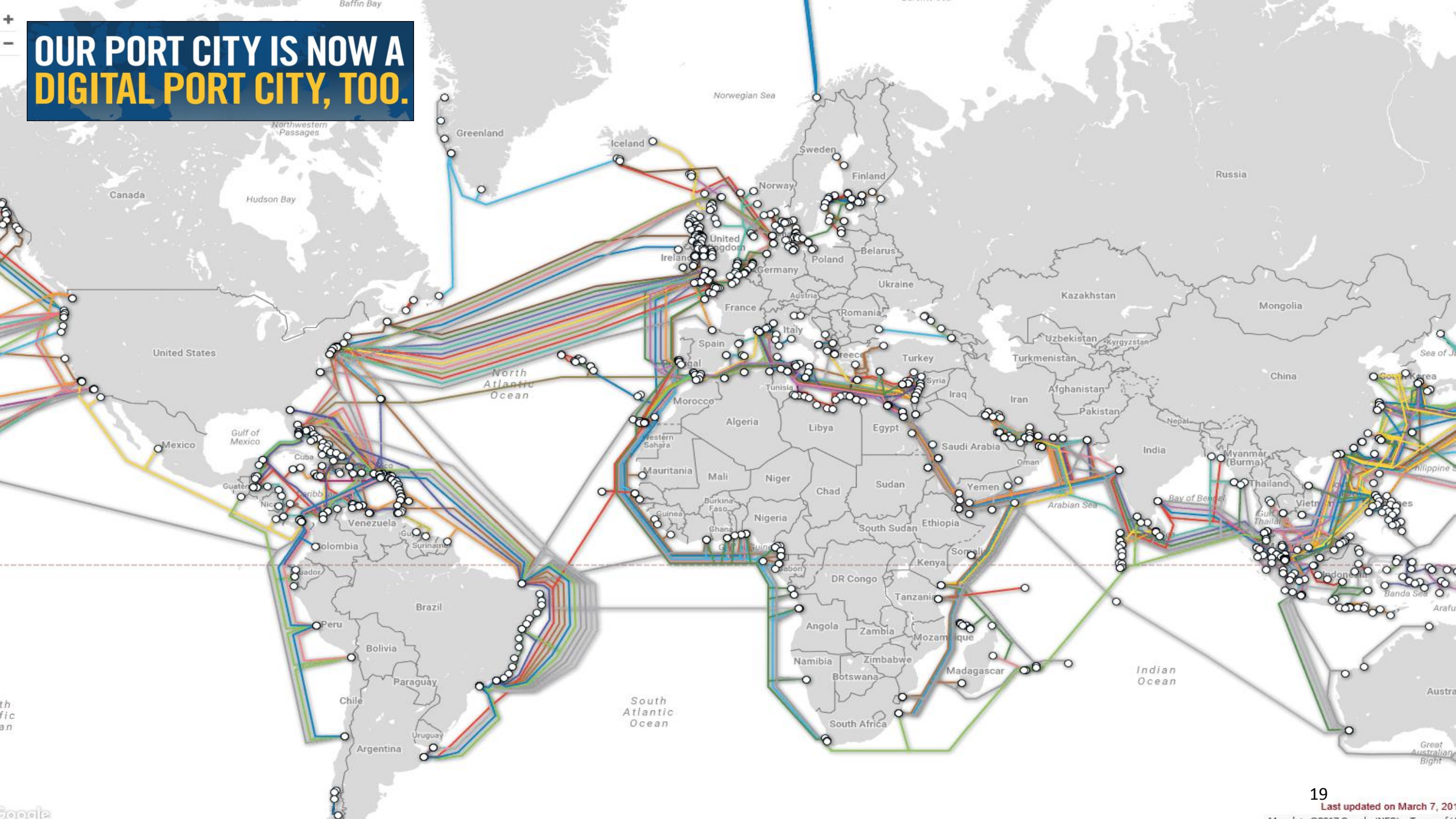
Microsoft's Boydton Data Center

Data Center Impact

- The two subsea cables; **MAREA** and **BRUSA** stretch from Spain and Brazil to the Cable Landing Point at the **Camp Pendleton** in Virginia Beach and extend to the Cable Landing Station at Corporate Landing.
- These connections will provide several opportunities; examples are possibilities to connect to **Microsoft Cloud Services Data Center, Boydton Virginia**, and or **Ashburn Virginia**, also known as the “Center of the Internet”



**OUR PORT CITY IS NOW A
DIGITAL PORT CITY, TOO.**



Regional Opportunities to Leverage Connectivity

- **Create a fiber-ready region to attract new businesses and high-paying jobs**
- **Leverage available assets for regional connectivity, educational and economic opportunities, and workforce development**
- **Position the region to pursue public/private partnerships**
- **Leverage future grants that promote regionalism as well as educational programs**
- **Create fiber infrastructure and connectivity to meet smart region capabilities**
- **Create diverse routes to support public safety infrastructure**

The Beginning of the End for Copper



- The FCC voted recently to relax the rules for retiring copper wiring. This change was specifically aimed at Verizon and AT&T and is going to make it a lot easier for them to tear down old copper wiring.
- This change reverses rules put in place in 2014 that required that the telcos replace copper with service that is functionally as good as the copper facilities that are being removed.
- If the telcos tear down copper in towns then customers will lose the option to buy DSL. This will give the cable companies a true monopoly in towns or neighborhoods where the copper is removed. Customers losing low-cost DSL will face a price increase if they want to keep broadband.
- In most of rural America the copper network is used to deliver telephone service and there are still a lot of rural customers buying telephone service. A big concern in rural areas will be losing access to 911. A lot of homes still keep landlines just for the 911 capabilities. Under the old rules the carriers had to demonstrate that customers would still have access to reliable 911, but it seems the carriers can now walk away without worrying about this.

<https://potsandpansbyccg.com/2017/11/20/the-beginning-of-the-end-for-copper/amp/>

The Unacceptable Persistence of the Digital Divide

- Lack of broadband access results in **residential Digital Divide** among the underserved and unserved citizens
- Only low-cost internet service providers can respond to the demand for affordable internet to address the **business Digital Divide**



Connectivity & Broadband Expansion

- **Hampton Roads Regional Transportation Advisory Committee (HRTAC) decision is to fund the regional transportation needs and with the arrival of Transoceanic Fiber connections to Europe and South America, it is now time to implement a regional broadband strategy to continue developing Hampton Roads as a nationally connected 21st century community and an international gateway.**
- **What we have done with Go VA**

Broadband Initiative - GO Virginia Goals

- ☒ **Collaboration Between Two or More Localities**
- ☒ **Collaboration with Higher Education**
- ☒ **Potential to Create High Paying Jobs**
- ☒ **Promotes Innovation**

Benefits of Regional Connectivity

Create Middle Mile Infrastructure

➤ Government

- Provide jurisdictional connectivity for Southside operations
- Create regional interoperability:
 - ❑ Build robust Public Safety infrastructure
 - ❑ Establish unified and redundant 911 center
- Potential for expanded shared services for all departments

➤ Economic Development

- Foster an ecosystem of low-cost internet service providers to meet demand for affordable internet to address the business Digital Divide
- Attract new enterprises with high-paying jobs to region (i.e. Biomed, cyber security, and financial services)
- Construct broadband infrastructure to support business incubators, technology innovators, product accelerators, and data centers
- Retain newly educated/skilled workforce by expanding advanced technology enterprise

➤ Education

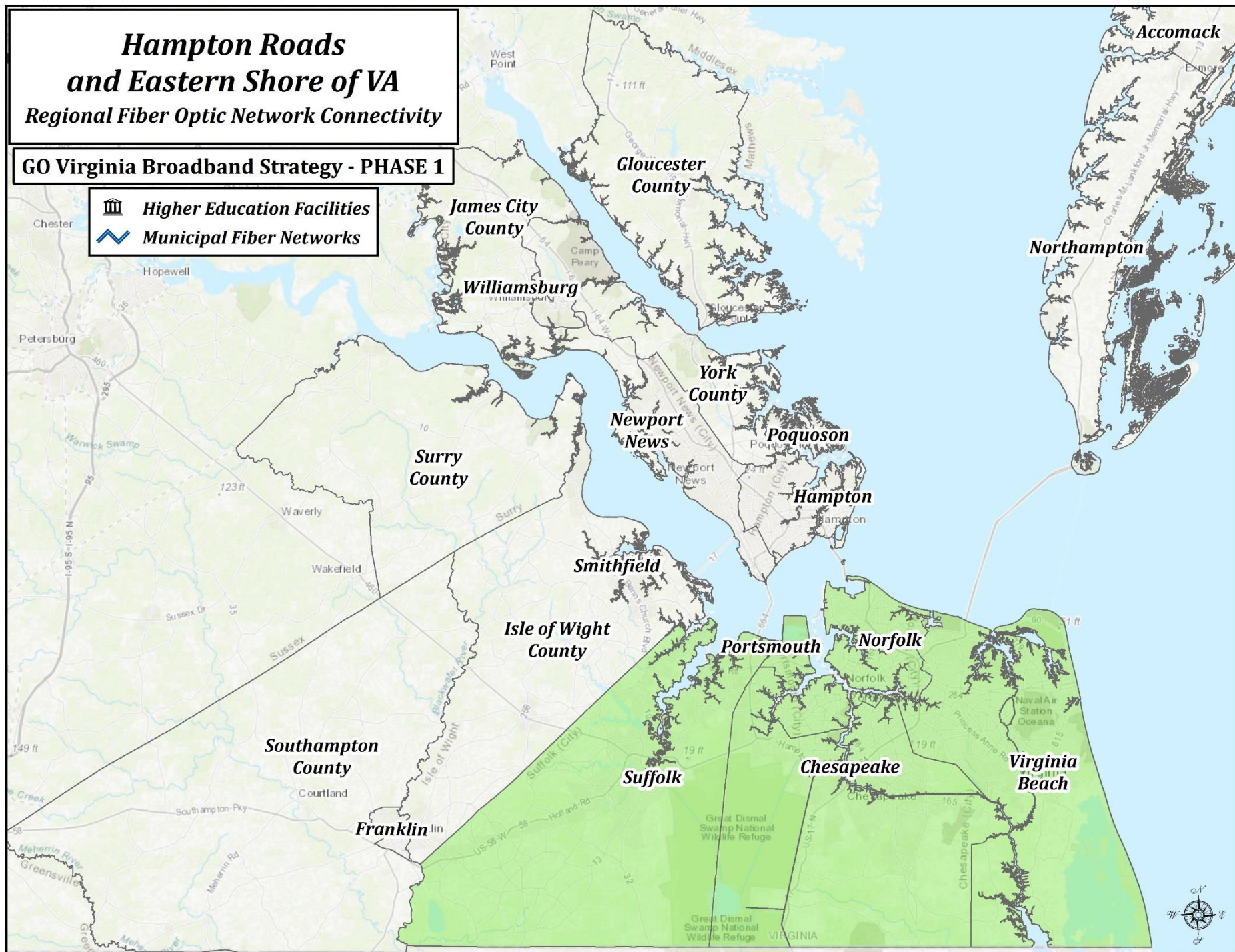
- Integrate higher education institutions for collaborative research
- Provide bandwidth to support growing educational needs (e.g., virtual classrooms)
- Provide affordable access to underserved and unserved citizens to address the residential Digital Divide

Hampton Roads and Eastern Shore of VA

Regional Fiber Optic Network Connectivity

GO Virginia Broadband Strategy - PHASE 1

-  Higher Education Facilities
-  Municipal Fiber Networks

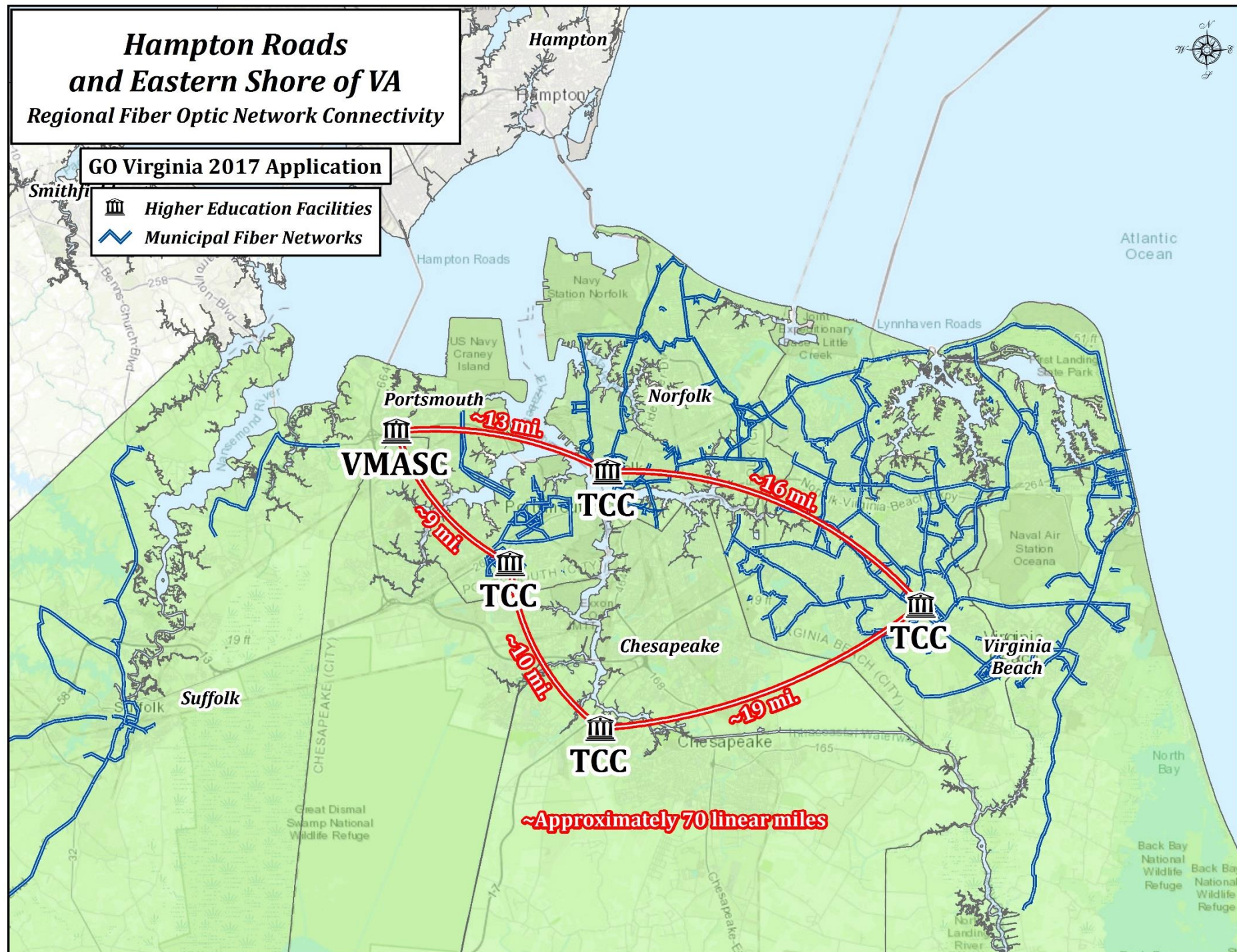


Hampton Roads and Eastern Shore of VA

Regional Fiber Optic Network Connectivity

GO Virginia 2017 Application

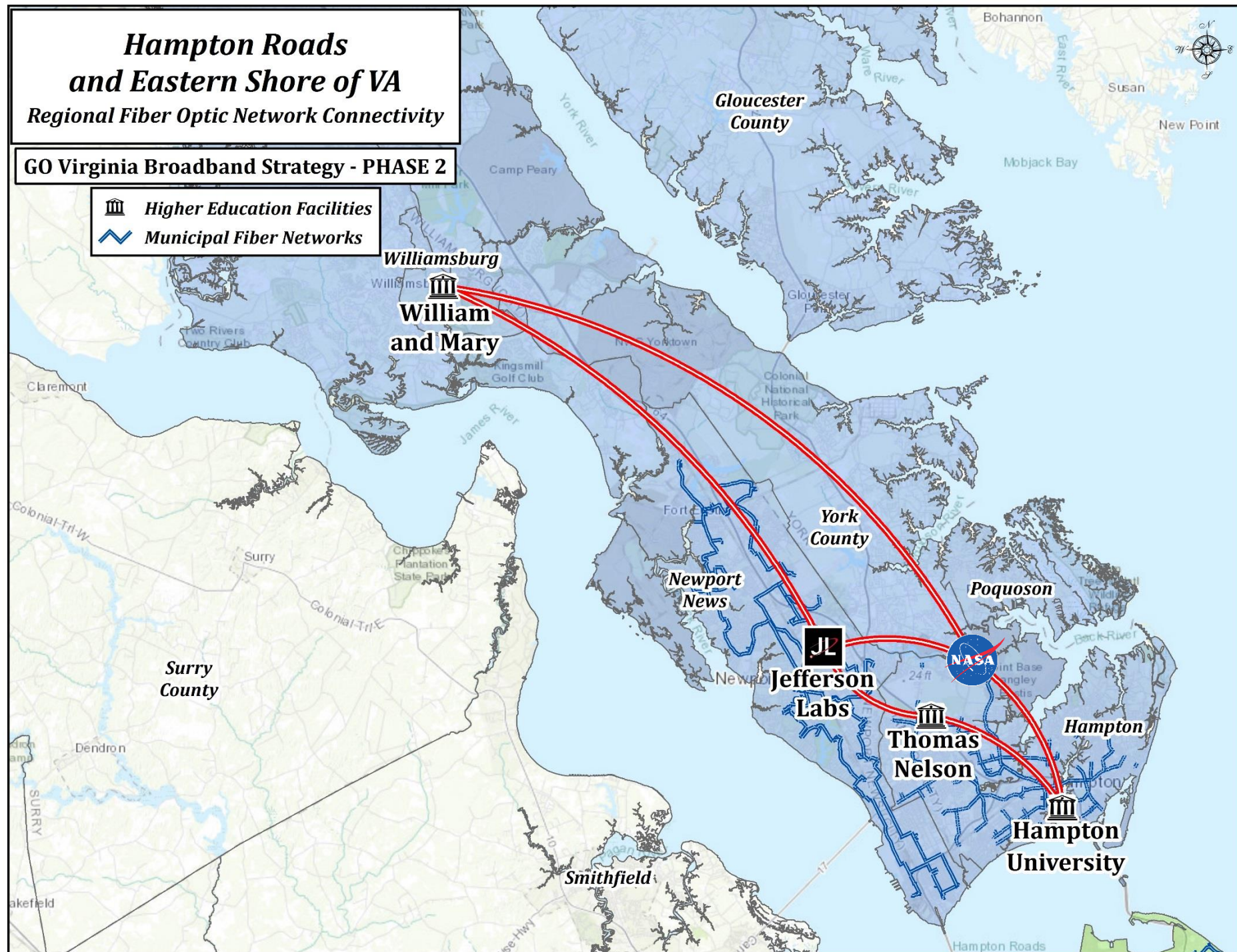
-  Higher Education Facilities
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Hampton Roads and Eastern Shore of VA Regional Fiber Optic Network Connectivity

GO Virginia Broadband Strategy - PHASE 2

-  Higher Education Facilities
-  Municipal Fiber Networks

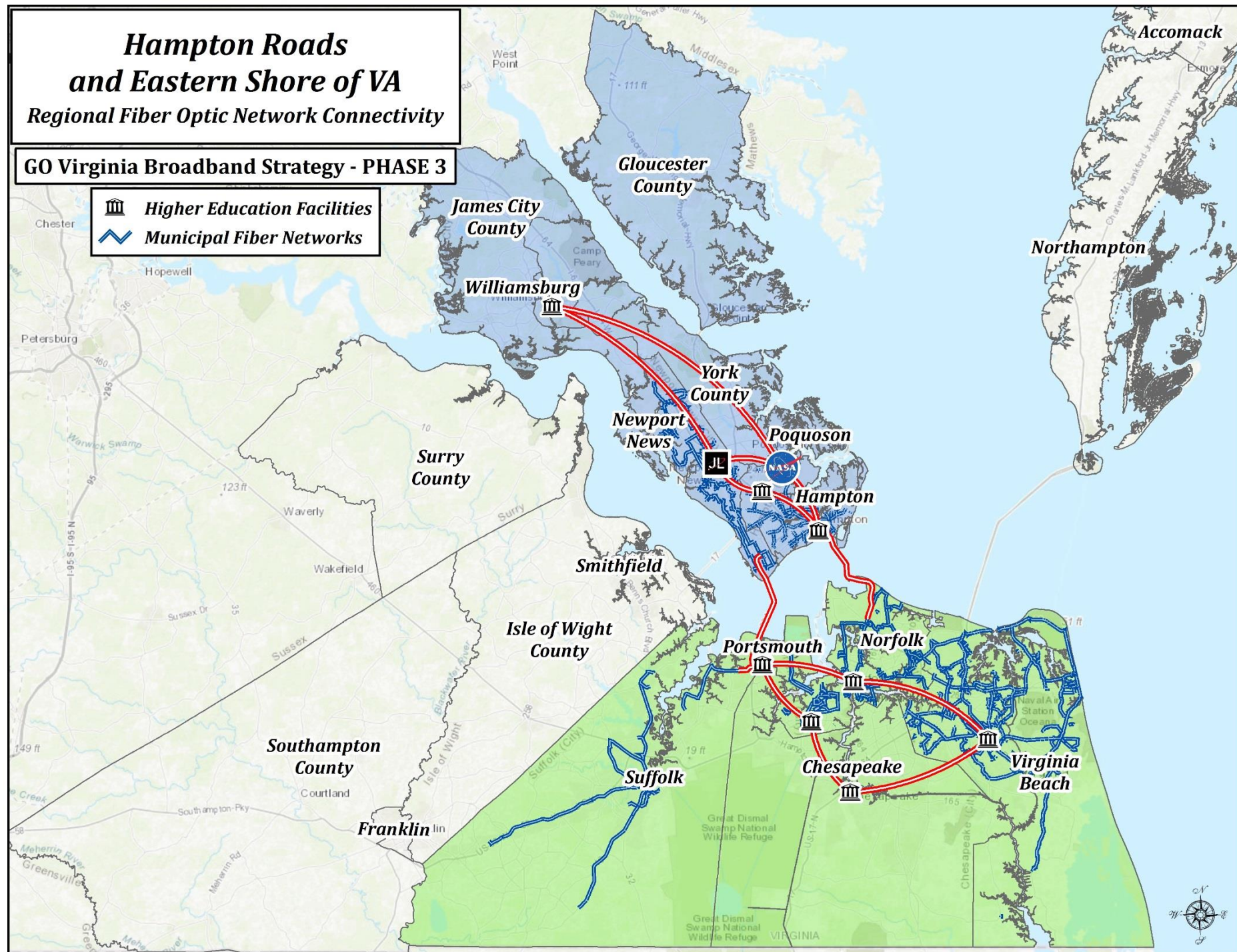


Hampton Roads and Eastern Shore of VA

Regional Fiber Optic Network Connectivity

GO Virginia Broadband Strategy - PHASE 3

-  Higher Education Facilities
-  Municipal Fiber Networks

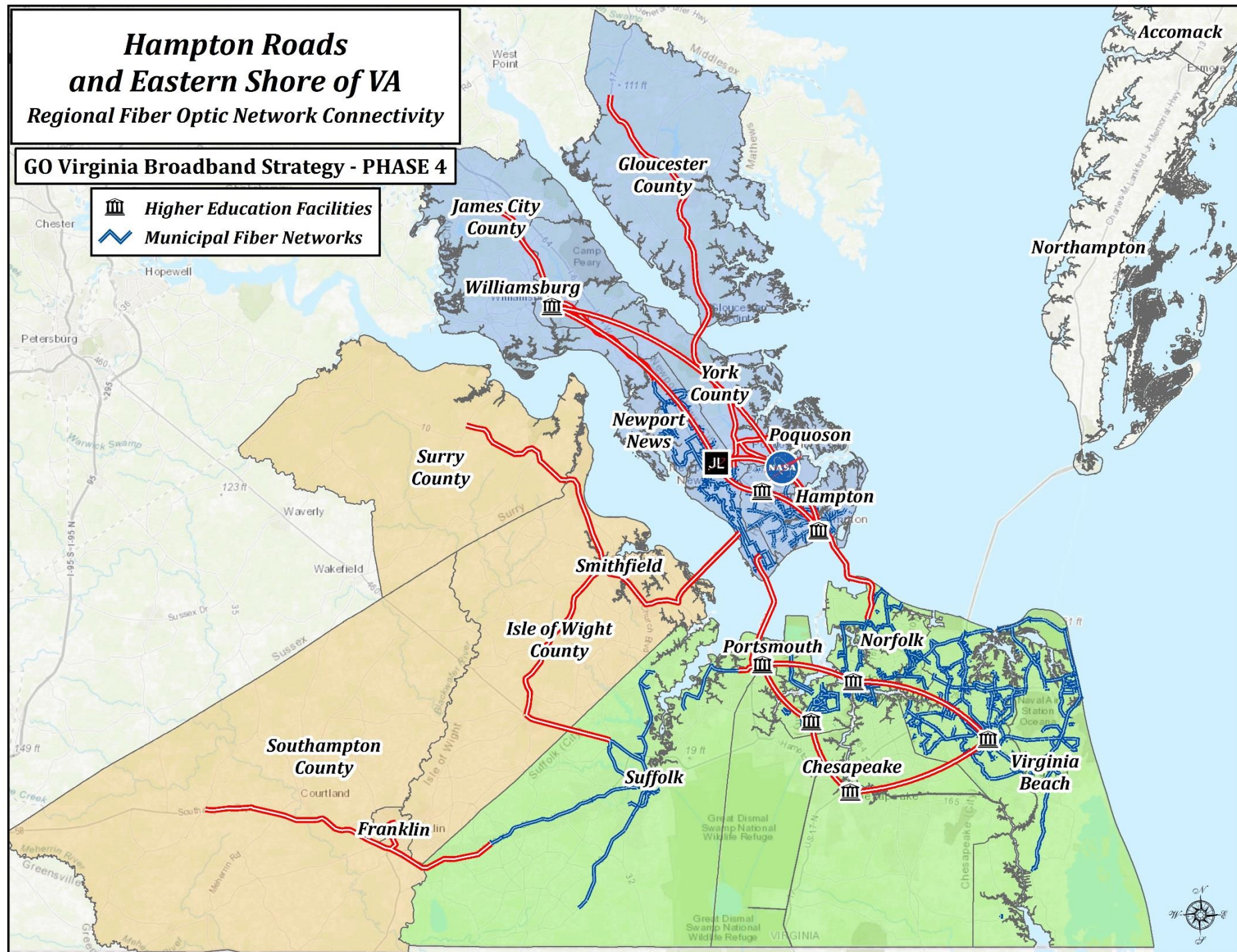


Hampton Roads and Eastern Shore of VA

Regional Fiber Optic Network Connectivity

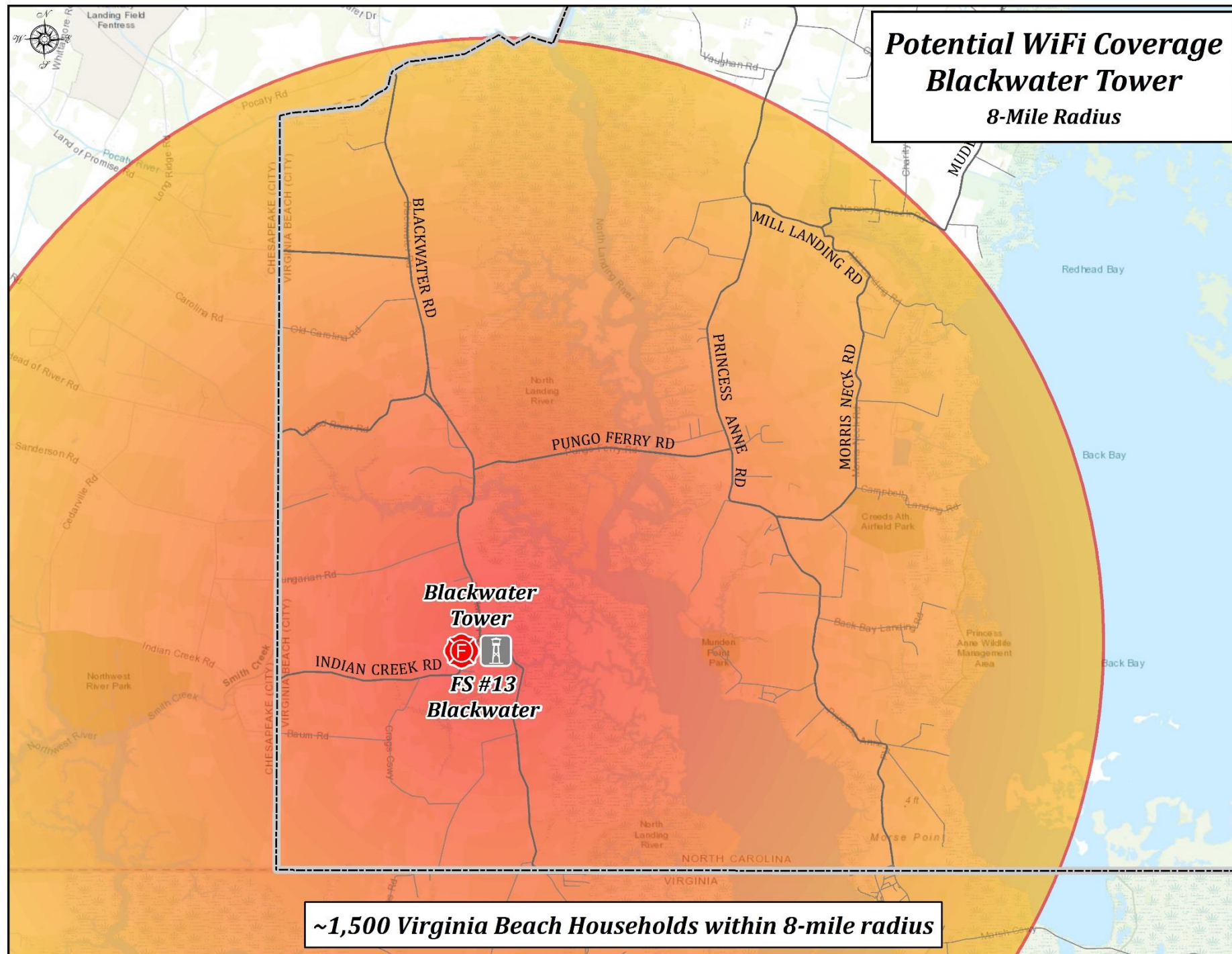
GO Virginia Broadband Strategy - PHASE 4

-  Higher Education Facilities
-  Municipal Fiber Networks



Wi-Fi Integration




- **WildFire 5G in partnership with Microsoft provide low cost, high performance, hybrid networks and protected internet to the city of Virginia Beach and other Hampton Roads jurisdictions**
- **This solution will serve:**
 - **Public safety network**
 - **Underserved and unserved areas**
 - **To close the gap by addressing the Digital Divide**
 - **To support educational needs -Eliminating the Homework Gap – One account for every student**
 - **To deliver a Network that drives Community and Tourism**
 - **To address accessibility and affordability for broadband**
- **Features**
 - **Speeds up to 100Mbps for all users**
 - **Speeds of up to 300Mbps for business**
 - **Protected internet solution**

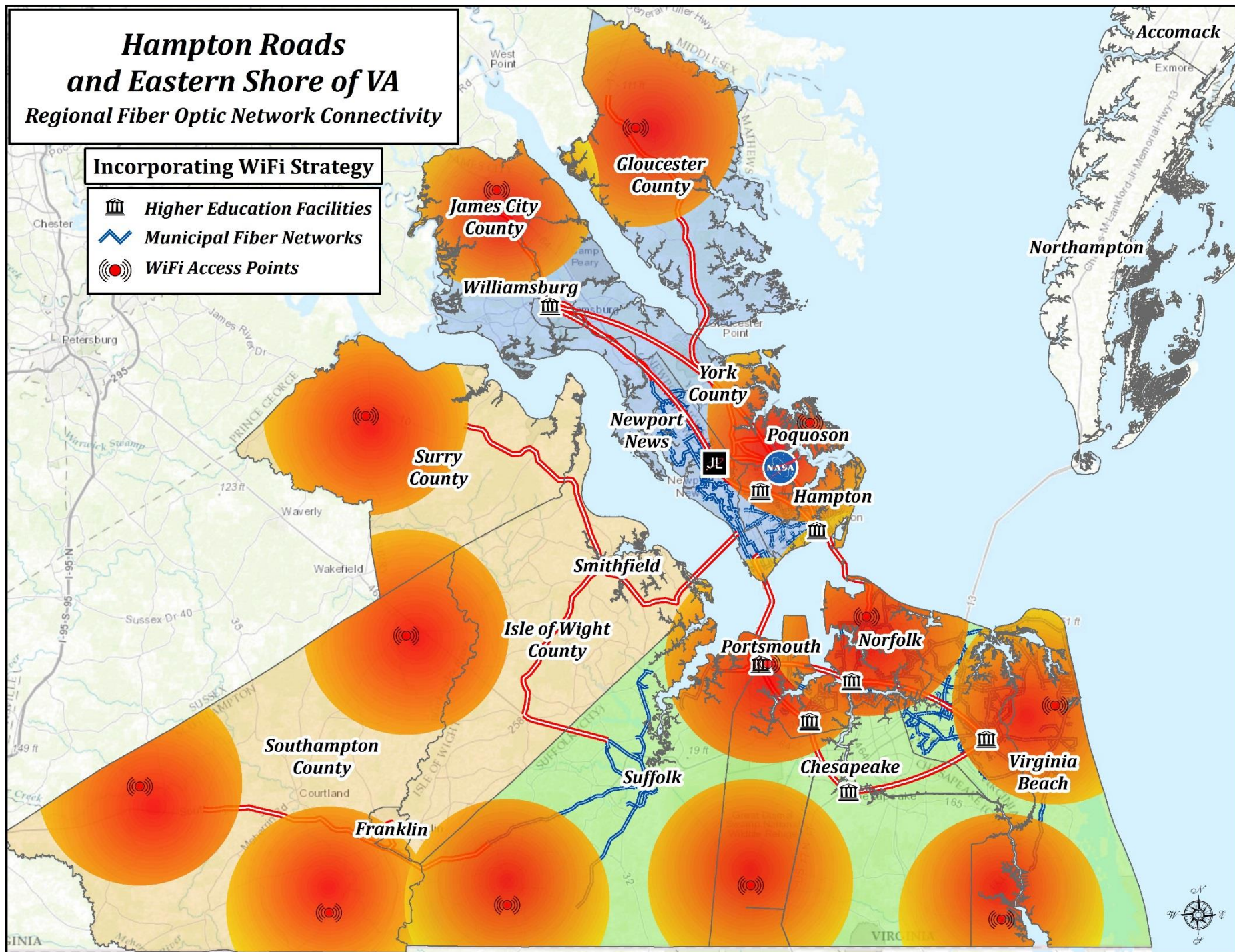


Hampton Roads and Eastern Shore of VA

Regional Fiber Optic Network Connectivity

Incorporating WiFi Strategy




-  Higher Education Facilities
-  Municipal Fiber Networks
-  WiFi Access Points

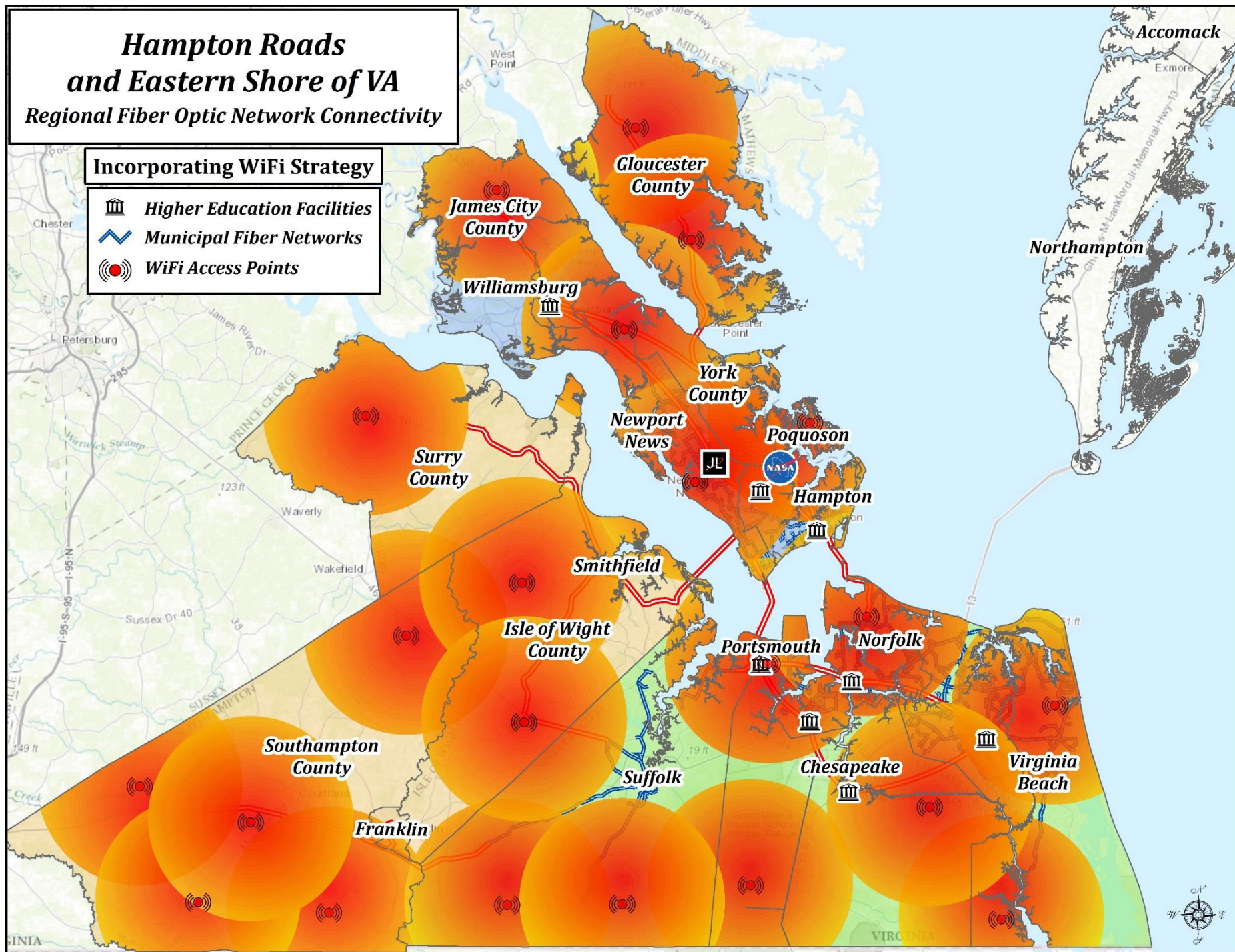


Hampton Roads and Eastern Shore of VA

Regional Fiber Optic Network Connectivity

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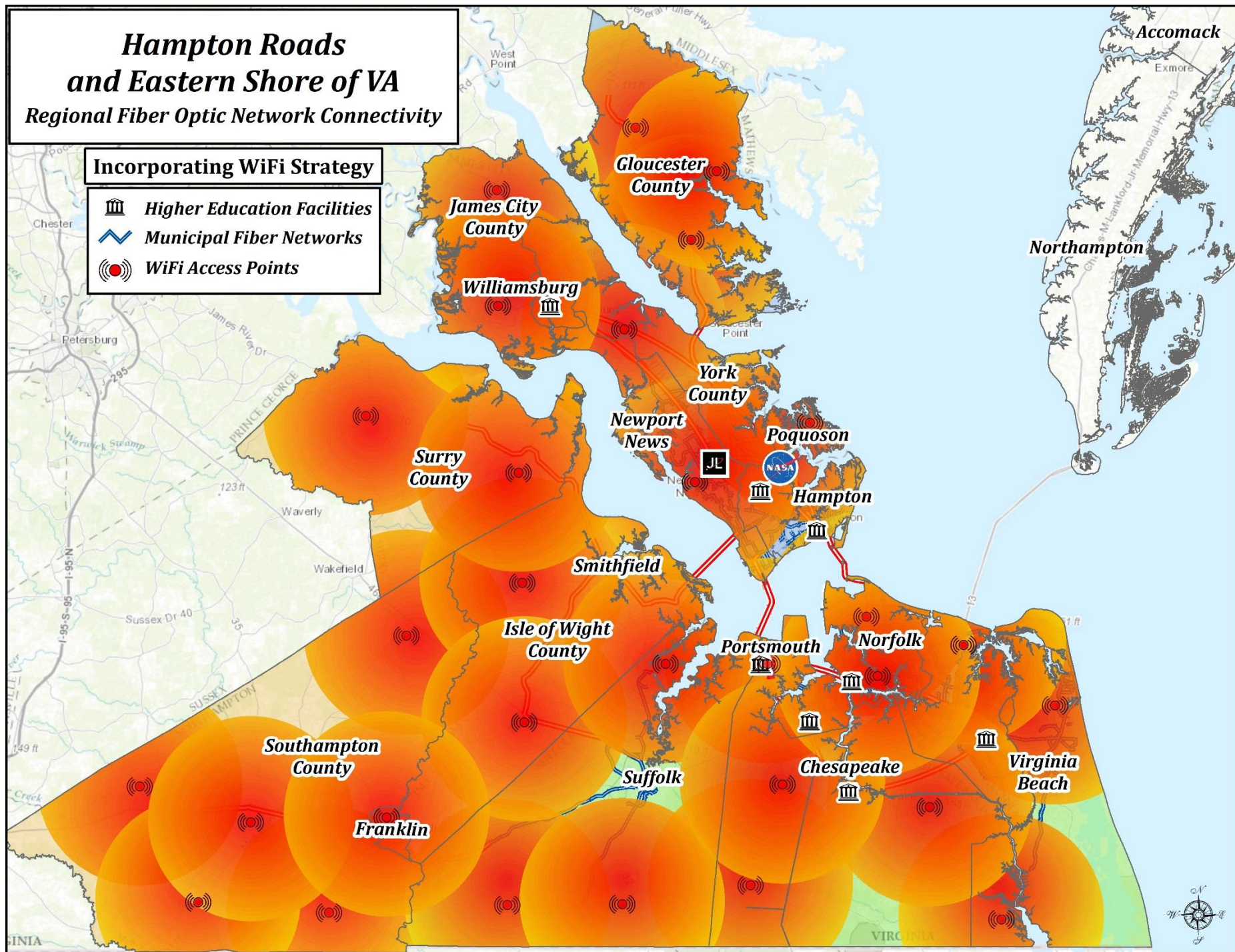


Hampton Roads and Eastern Shore of VA

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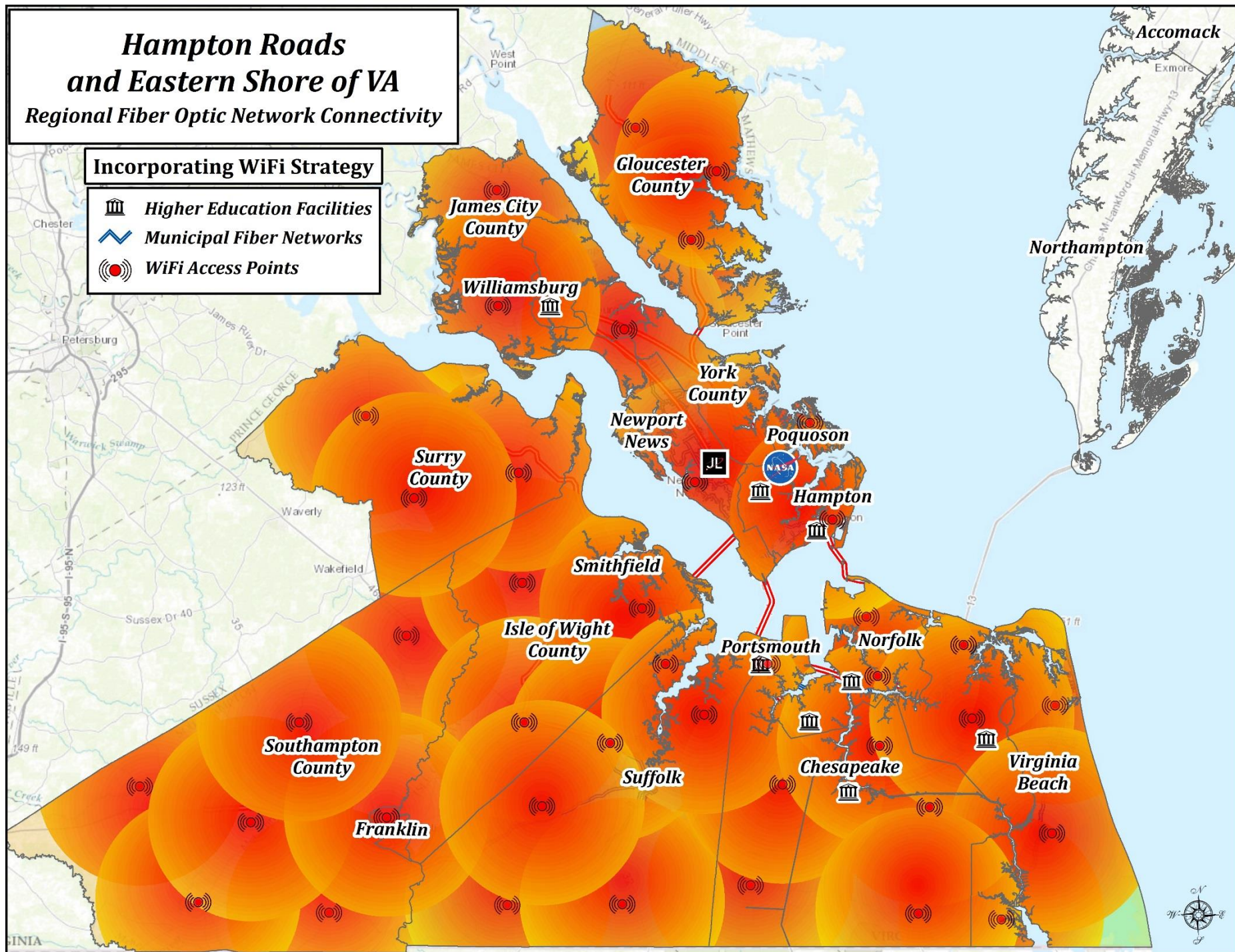


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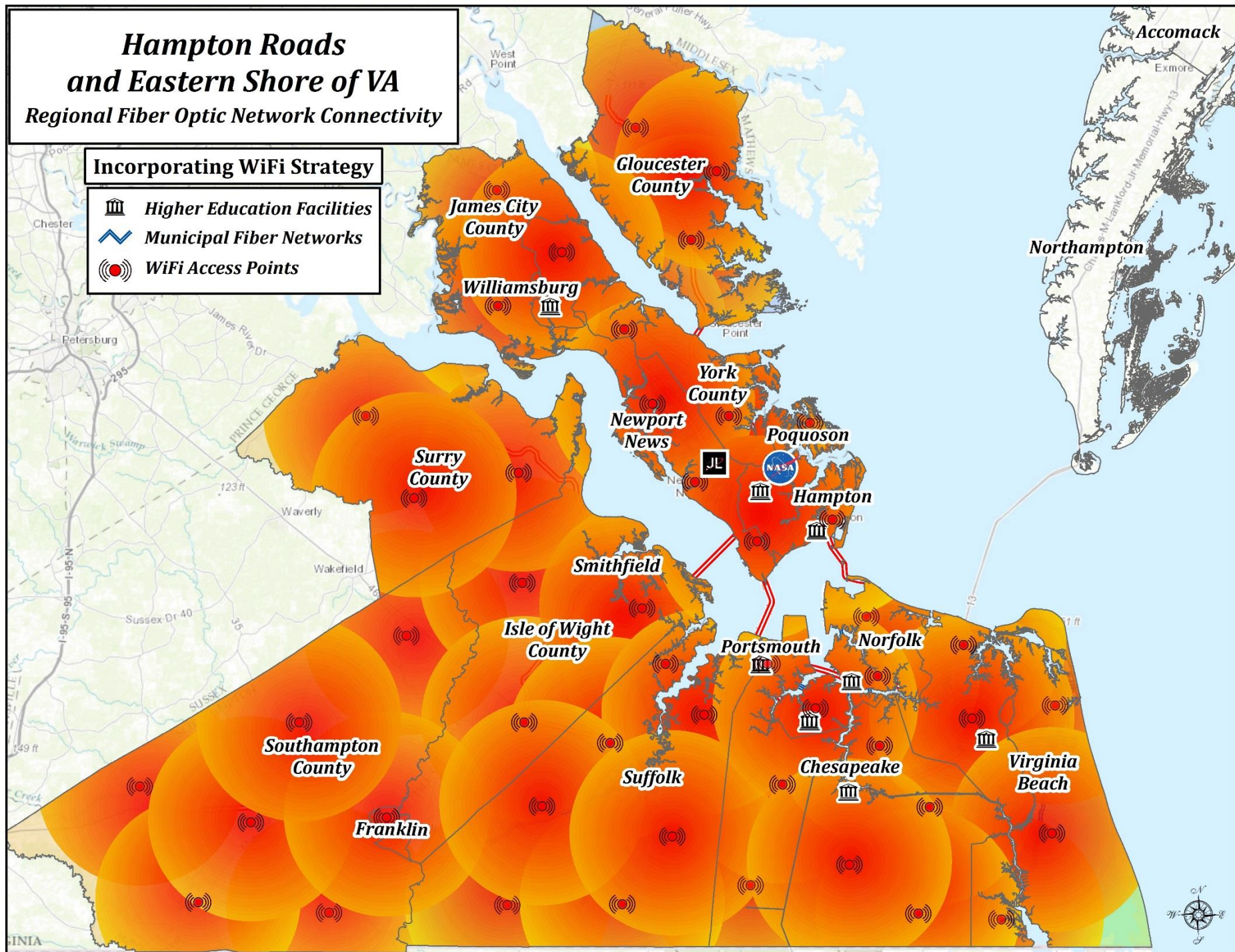


Hampton Roads and Eastern Shore of VA

Regional Fiber Optic Network Connectivity

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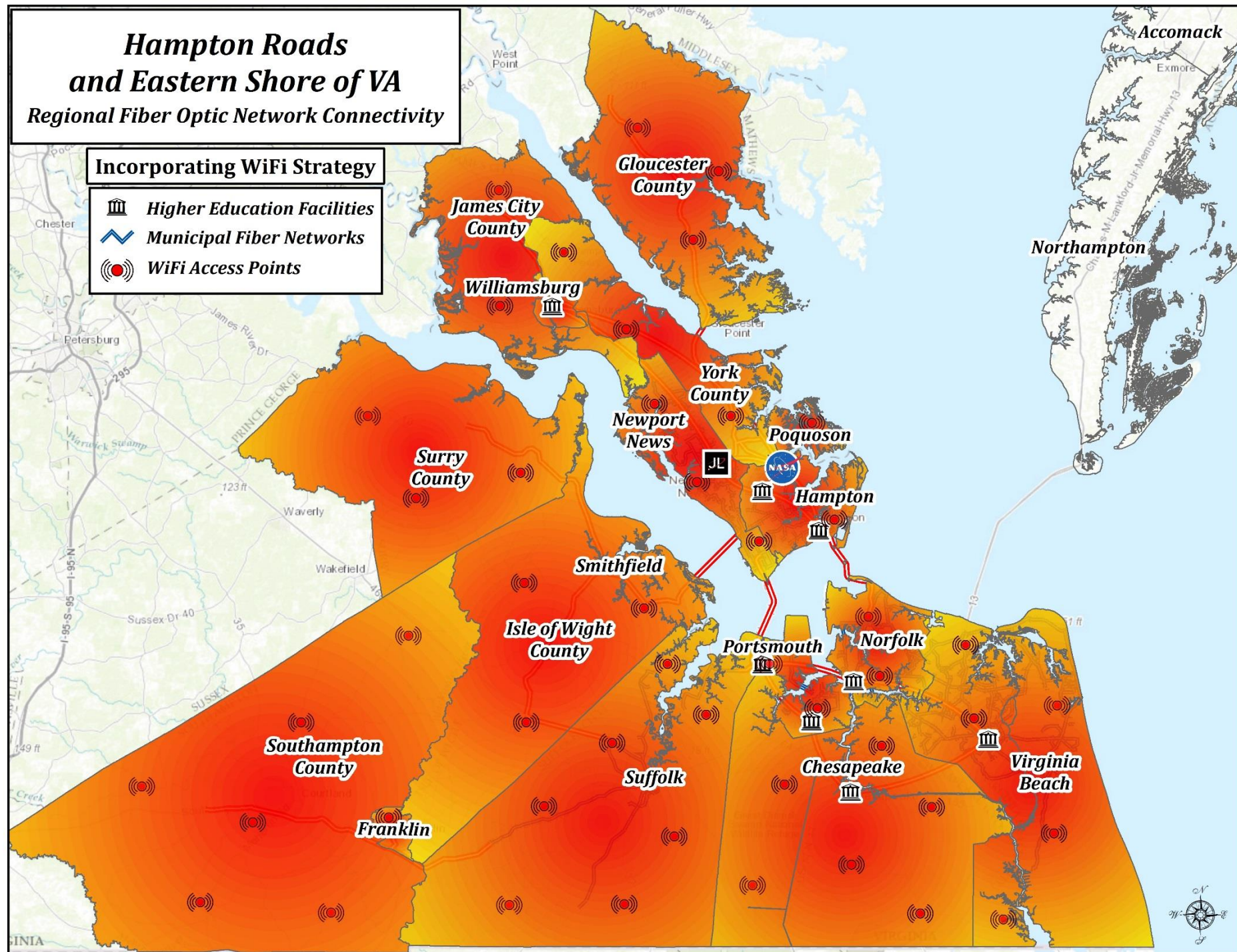


Hampton Roads and Eastern Shore of VA

Regional Fiber Optic Network Connectivity

Incorporating WiFi Strategy




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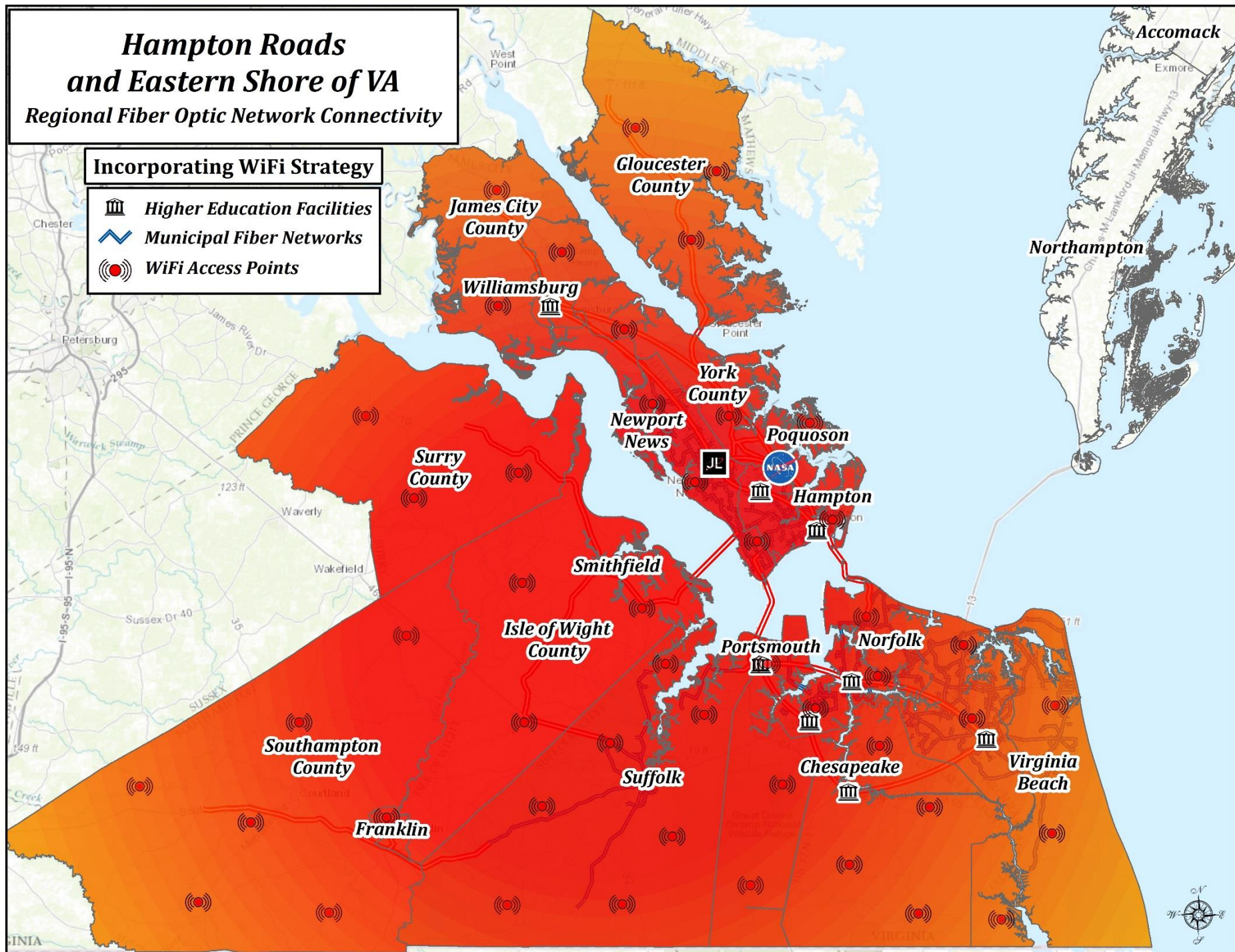


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